Appl. No. 10/645,682
Examiner: Tsai, H Jey, Art Unit 2812
In response to the Office Action dated October 28, 2004

Date: January 26, 2005
Attorney Docket No. 10112801

REMARKS

Responsive to the Office Action mailed on October 28, 2004 in the above-referenced application, Applicant respectfully requests amendment of the above-identified application in the manner identified above and that the patent be granted in view of the arguments presented. No new matter has been added by this amendment.

Present Status of Application

Claims 1-14 are pending. Claims 1-14 are rejected under 35 U.S.C. § 102(e) as being anticipated by Shu (US 2003/0181016). Claims 1-14 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of co-pending application Serial No. 10/283,977 (Shu).

In this paper, claims 1, 4 and 9 are amended to recite an anisotropic etching of the mask layer (claim 1) or the photoresist layer (claims 4 and 9). Support of the limitation can be found on page 9, lines 4-7 of specification:

> "In FIG. 3f, the photoresist layer 310a and 310b are anisotropically etched at an angle greater than 45 degrees relative to the normal angle. The anisotropic etching can be reactive ion etching or plasma etching."

Reconsideration of this application is respectfully requested in light of the amendments and the remarks contained below.

Drawings

Applicant notes that the features indicated by the reference numerals 202, 203 and 209 in Fig.2d were corrected to conform with Fig.2e and Fig.2f in the amendment filed on August 6, 2004.

Rejections Under 102(e)

Claims 1-14 are pending. Claims 1-14 are rejected under 35 U.S.C. § 102(e) as being anticipated by Shu. To the extent that the grounds of the rejections may be applied to the claims now pending in this application, they are respectfully traversed.

Shu teaches a method of forming a bottom electrode of a capacitor in a memory device in which an exposure process performed with a predetermined incident angle of light source is followed by a developing process to remove portions of the photoresist layer.

Shu does not teach a method for filling a uniform mask layer in a trench of a trench capacitor comprising the step of anisotropically etching the mask layer at an angle until the dense trench area and the less dense trench area in the semiconductor substrate are exposed to leave the mask layer in the trenches, as recited in claim 1.

MPEP 2131 prescribes that to anticipate a claim, a reference must teach every element of the claim. In this regard, the Federal Circuit has held:

> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).
>
> "The ***identical invention*** must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). [emphasis added]

Applicant once again stresses that that the exposure/developing process disclosed in Shu is not ***identical*** in the art to the etching at an angle step recited in claim 1. Furthermore, as amended, claim 1 recites a step of ***anisotropically*** etching the mask layer at an angle until the dense trench area and the less dense trench area in the semiconductor substrate are exposed to leave the mask layer in the trenches. Claim 2 recites an anisotropic etching process at an angle greater than 45 degrees relative to the normal angle to remove the mask layer until the dense trench area and the less dense trench area in the semiconductor substrate are exposed to leave the mask layer in the trenches.

The office action relies on the developing process to remove portions of the photoresist layer in Shu to teach the etching step of claim 1. However, the developing process performed in Shu is an ***isotropic*** process. Namely, the developing process using a chemical is invariant with respect to direction. It is therefore Applicant's belief that the step of anistropically etching the mask layer at an angle is not ***identical*** to the steps of exposing a photoresist layer at an angle

followed by an isotropic developing process as described by Shu. Applicant therefore submits that claim 1 is not anticipated by Shu.

For at least this reason, it is Applicant's belief that claim 1 is allowable over the cited reference. Insofar as claims 2-3 depend from claim 1, it is Applicant's belief that these claims are also in condition for allowance.

Shu does not teach a method for filling a uniform mask layer in a trench of a trench capacitor of a DRAM, comprising the step of anisotropically etching the photoresist layer at an angle until the dense trench area and the less dense trench area in the semiconductor substrate are exposed to leave the photoresist layer in the trenches, as recited in claim 4, or a method for forming a uniform bottom electrode in a trench of a trench capacitor comprising anisotropically etching the photoresist layer at an angle until the dense trench area and the less dense trench area in the semiconductor substrate are exposed to leave the photoresist layer in the trenches, as recited in claim 9.

For the same reasons stated in connection with claim 1, it is Applicant's belief that Shu does not teach anisotropically etching the photoresist layer at an angle as recited in claims 4 and 9. For at least this reason, it is Applicant's belief that claims 4 and 9 are allowable over the cited reference. Insofar as claims 5-8 and 10-14 depend from claims 4 and 9, respectively, it is Applicant's belief that these claims are also in condition for allowance.

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Double Patenting

Claims 1-14 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of co-pending application Serial No. 10/283,977. The Examiner is advised that application Serial No. 10/283,977 was issued as US Patent No. 6,682,983, on January 27, 2004.

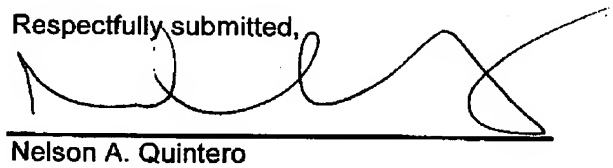
Attached is a terminal disclaimer under 37 C.F.R. 1.321 to obviate the double patenting rejection over US Patent No. 6,682,983. The disclaimer is made solely for the purpose of advancing the prosecution of the application and should not be construed as an admission with respect to the merits of the rejection.

Finally, Applicant notes that a statement under 103(c) was submitted in connection with Shu in the amendment filed on August 6, 2004.

Conclusion

The Applicant believes that the application is now in condition for allowance and respectfully requests so.

Respectfully submitted,



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